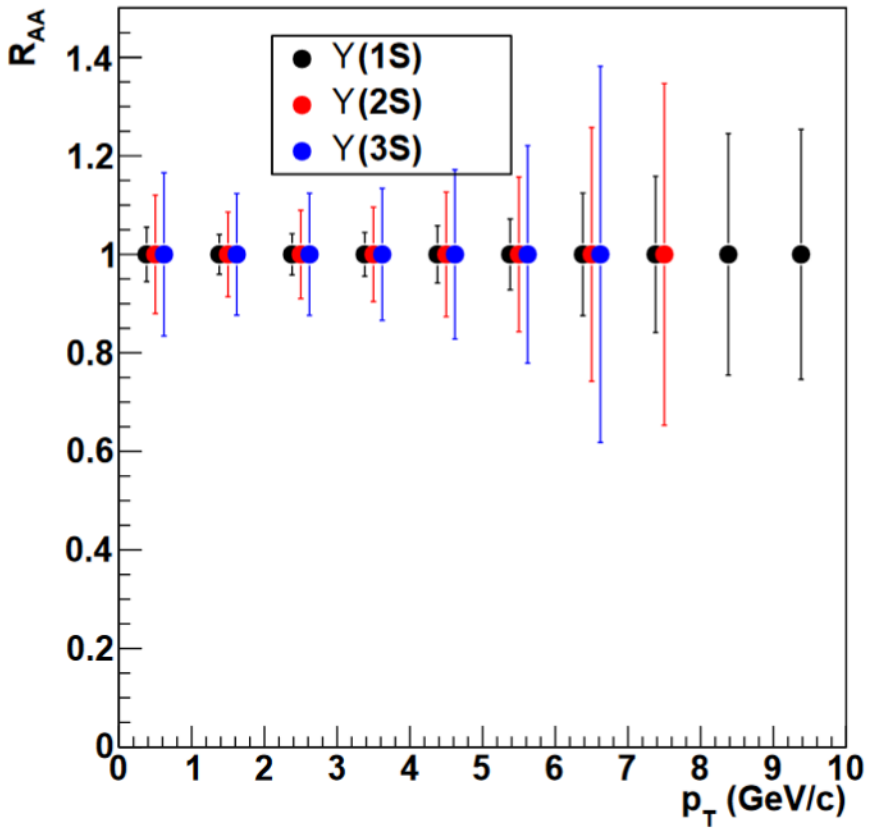
Upsilon R_{AA} in sPHENIX update

Sasha Lebedev (ISU)

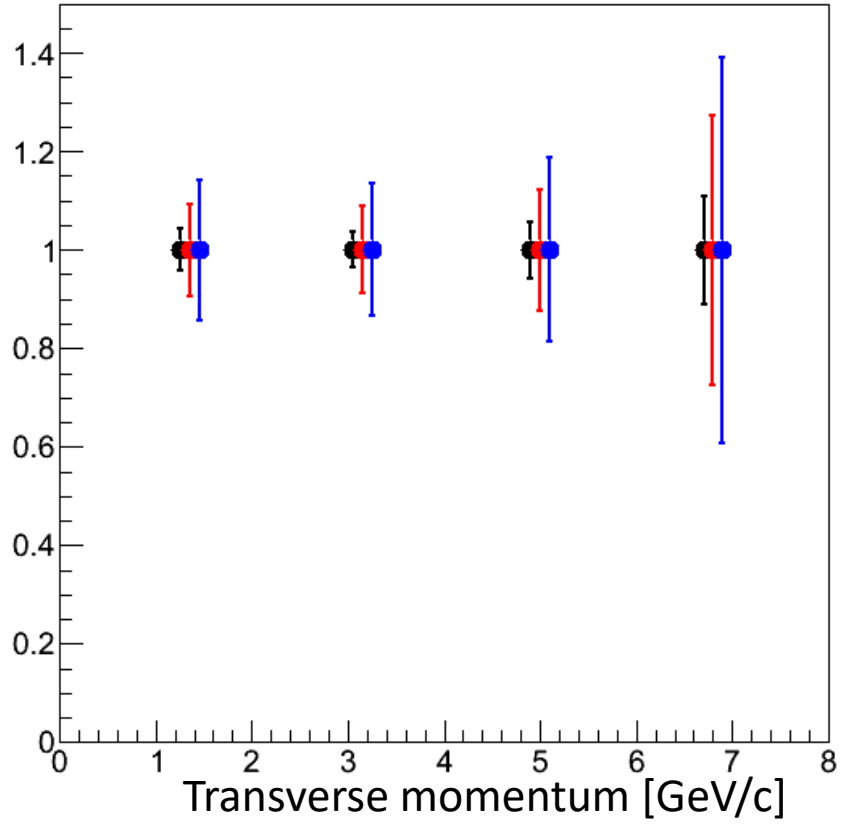
Found a mistake in error propagation.
Uncertainty from p+p measurement was not properly propagated.

No suppression

Upsilon R_{AA} from sPHENIX proposal



New Upsilon R_{AA} with correct error propagation



The error bars are slightly smaller now, but considering bin size the uncertainty is somewhat worse.

Realistic suppression

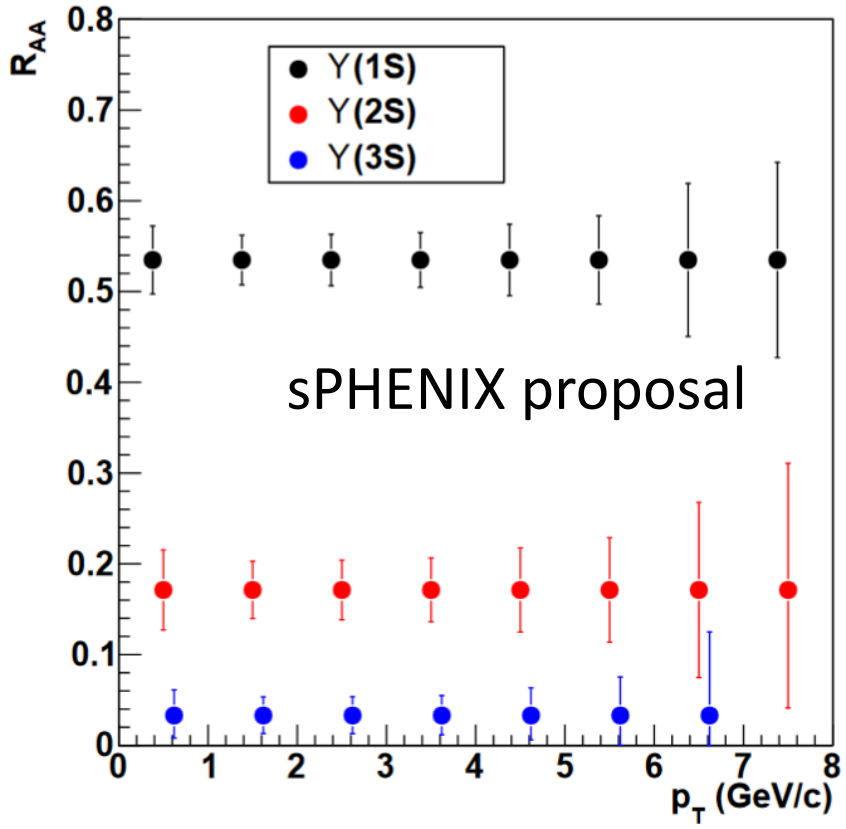
Theory prediction from:

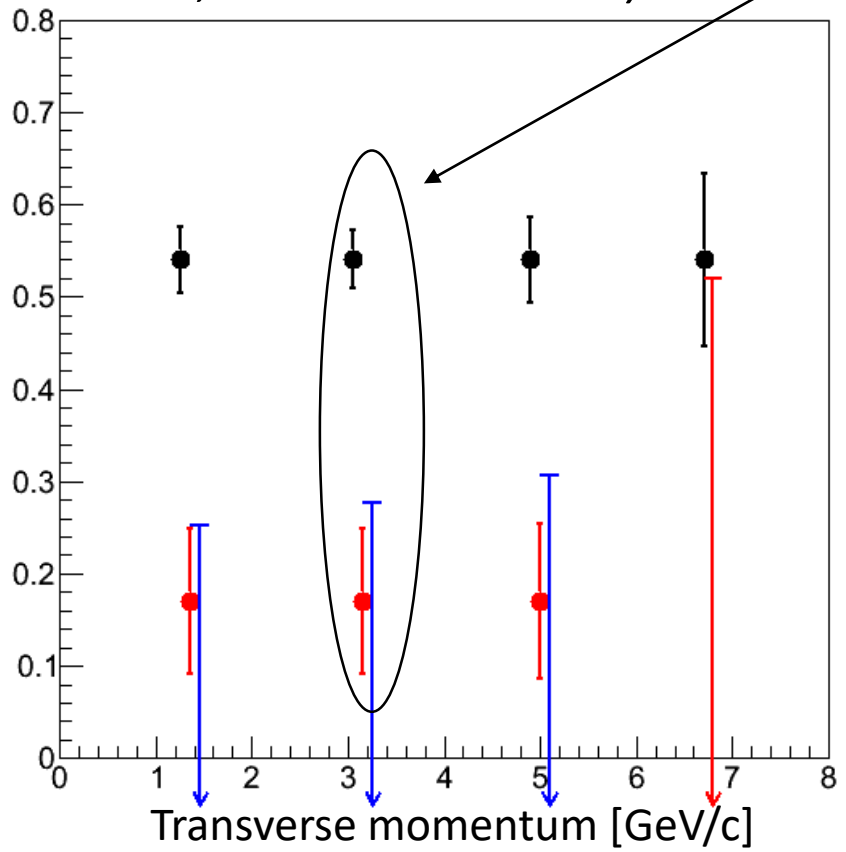
M. Strickland and D. Bazow, Nucl. Phys., A879:25–58, 2012; arXiv:1112.2761

Agrees with PHENIX measured R_{AA} = 0.50 ± 0.18(stat) ± 0.11 (sys)

(A.Adare et al., (PHENIX Collaboration) Phys. Rev. C91 024913; arXiv 1404.2246v3)

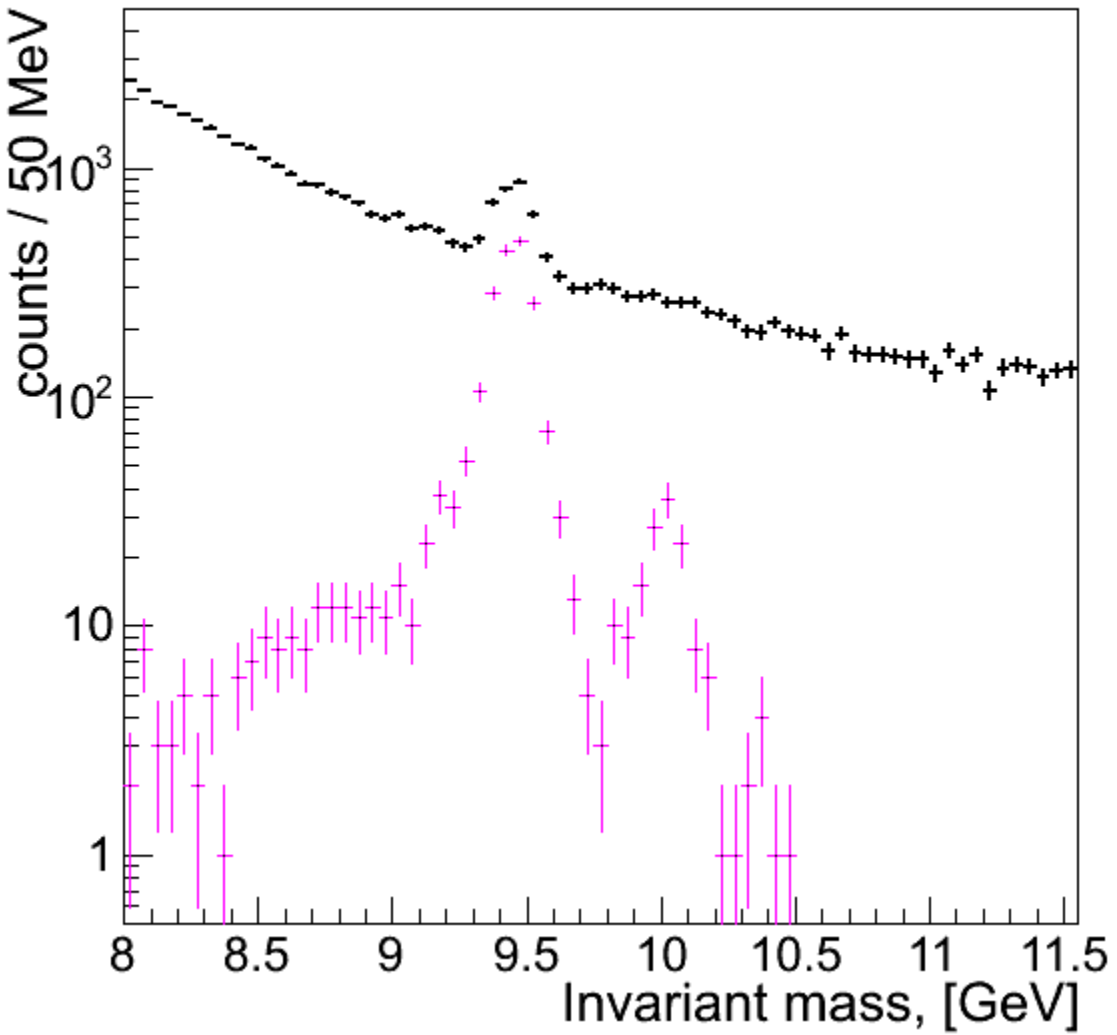
This point on next slide





Y(1S) uncertainty is in reasonably good agreement, but Y(2S) and Y(3S) errors are much larger

Example for $2<p_T<4$GeV/c (realistic suppression)



What's different now from the proposal?

- Correct hadron rejection factors now
  - *rejection better at high p_T, but worse at low p_T*
- Includes anti-protons (and protons and kaons)
  - *anti-protons are the main source of fake electrons below ~4.5 GeV*
- Background is now calculated vs. p_T (was integrated over all p_T)
- 0.9 eID efficiency in AuAu (was 0.7)
  - *in p+p eID efficiency 0.9 in both cases*
- Direct Upsilon counting now vs. Crystal Ball fit (?)
  Direct counting in mass range: 9.10 - 9.60; 9.85 - 10.20; 10.25 -10.45 GeV
  - *accuracy of the measurement could probably be improved by using fit*

Conclusions

- For no suppression case reasonable agreement.
- For realistic suppression Y(1S) R_{AA} is in reasonable agreement, but Y(2S) and Y(3S) have much larger errors.